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DESCRIPTION OF THE PREPARATORY STAGES OF GRAPTA INTERROGATIONIS, FAB.

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EGG.—Conoidal, the base flattened and rounded ; marked by 8 or 9 vertical ribs, which near the base are low, but on upper third are considerably elevated, increase gradually in prominence and terminate abruptly around a small flat space at summit ; these ribs are thin and their sides are grooved perpendicular to the surface of the egg ; color pale green. Duration of this stage from 3 to 4 days in summer, in April and early May 10 days.

YOUNG LARVA.—Length 24 hours from egg .1 inch ; precisely like *Comma* at same stage ; cylindrical, even from 2 to 7, then tapering slightly to extremity ; on 2 is a chitinous dorsal patch on which are six tubercles, three on either side the medio-dorsal line, each with black hair ; below are two tubercles on either side ; on 3 to 13 are two dorsal rows of large tubercles, one to each segment, on the anterior part of same, each with long curved hair, from 3 to 7 turned forwards, the rest back ; next, a row of small tubercles from 3 to 13 ; on 3 and 4, these stand under the dorsals, but on the other segments they are behind the line ; a third row of small tubercles from 5 to 13, under the dorsals, and on 2 to 4 is an extension of this row below the line of the other segments ; on 3 and 4 is a short row, in line with the spiracles, and a corresponding tubercle appears on 13 ; below spiracles, on the posterior part of each segment from 5 to 13, is a minute tubercle ; and finally, along base of body is a row of minute ones from 2 to 13, on 2 to 4 one to each segment, also on 13, but on the other segments, two to each ; from all these proceed hairs, those of the basal row depressed, but of the other rows, from 2 to 7 they are turned forward, the rest back ; color at first whitish-yellow, semi-translucent, and some examples have the dorsum crossed by brownish patches alternating with the yellow ; as the stage proceeds the body becomes red-brown, with white on dorsum of segments 4, 6, 8, 10, with variation in

this respect ; head rounded ; color shining black ; many black hairs scattered over the face curving downward. Duration of this stage 3 days in May, 2 in summer.

After 1st Moulting.—Length .14 inch soon after the moult, in 24 hours .20 inch ; slender, even ; color red-brown, with indistinct whitish lines ; of these, a wavy line runs with second laterals ; from base of each first lateral is an oblique line outward to the front of the segment, and from each dorsal are two such lines, one on either side ; armed with seven rows of spines, one dorsal, and three on either side, disposed as in *Comma* ; these are short, stout, black, beset at top with short branches, with some shorter spines on the sides, each ending in a black bristle ; as the larva approaches second moult, the bases of the dorsal and 1st lateral spines become white or yellow, or reddish-yellow, while the color becomes more red, and the lines become more distinct ; on 2 is a dorsal transverse row of 4 short, simple spines ; legs and feet dark brown ; head rounded, depressed at top, the vertices a little produced, each bearing a stout, thick, black process, with conical spine at top, and shorter ones around the base of this ; color black, with many black hairs. Duration of this stage from 2 to 3 days.

After 2nd Moulting.—Length .24 inch ; color black, the lines as before, with the addition of one running with lower laterals, more distinct, often macular ; spines as before, but variable in color ; in some examples, all are black except the dorsals and 1st laterals on 4, 6, 8, 10, where they are reddish-yellow ; some have the spines on these rows light, except on 9, 11 and 12 ; usually the second laterals are black and the lower row is pale yellow ; in all cases the tips are black ; as the stage proceeds the color of body changes to olive-brown, and the lines become more conspicuous ; head as before, much covered with white simple spines. Duration of this stage from 2 to 3 days.

After 3rd Moulting.—Length .5 inch ; color black, with cream-white lines, quite macular ; spines very variable ; some examples have every spine of the upper five rows reddish to reddish-yellow, the lower laterals pale yellow ; some have the dorsals and 1st laterals from 3 to 11 red, the rest and all of second laterals black ; some have the body color vinous instead of black, with no black spines, the upper rows very red anteriorly, the lower laterals yellow ; the lines yellow ; head either deep brown-red, or decided red in the vinous larvae, the processes red, with spines both

red and black ; the spines on face yellow or white. Duration of this stage 2 to 3 days.

After 4th Molt.—Length .9 inch ; color deep black, the spines often very red, from deep red bases ; the surface much covered with tubercles, from small to minute, which are partly white, partly yellow, with many red ; the lines red, or red and yellow. In 2 to 3 days becomes full-grown.

MATURE LARVA.—Length 1.3 to 1.5 inch ; cylindrical, stout ; color dull black, with white and yellow and red tubercles on the cross ridges ; and longitudinal lines and bands of red and yellow, varying greatly in distinctness ; when most distinct, there is a band along the basal ridge ; a stripe running with second laterals, an oblique line from base of each first lateral outwards to the front of the segment, and one from front on either side of dorsals also to front of the segment ; when the lines are obsolescent, the yellow and red tubercles quite cover the surface ; under side black-brown ; spines in seven rows, one dorsal, three on either side, disposed as in *Comma* ; long, slender, tapering, with several branches at top, one being a continuation of the spine, the others arranged about its base somewhat irregularly ; these are of about equal length in the several rows, and others, which are shorter, are found on the sides of the spines, and are particularly numerous on the upper rows of the anterior segments ; the dorsals have 5 main branches, the 1st laterals 6, the 2nd and lower laterals 4 and 5 ; in most examples the dorsals and 1st laterals are red, except on 3, where they are red with black bases, and on 11 and 12, where they are usually black, the red being deepest on anterior segments ; the second laterals are sometimes all red, and the lower row is always yellow ; over the feet from 2 to 10 is a simple red spine ; on 2 is a dorsal row of six simple black spines ; spiracles conspicuous, black in white rings ; head obovoid, rather flattened, deeply cleft, the vertices high, and each bearing a stout and short black process, ending in a long spur, with five others about its base, each hair-tipped ; the face covered with simple spines and tubercles, some minute ; on each side below vertex are four long spines, black, the rest are mostly white, each with hair ; color either deep red-brown, or red, about the ocelli a large black patch. From 4th moult to pupation, 5 to 6 days.

Chrysalis.—Length 1 inch, greatest breadth .3 to .32 inch ; cylindrical ; head case high, compressed transversely, at each vertex a long, conical process ; mesonotum elevated, the carina very prominent, thin, nose-like, more rounded on the anterior side than in *Comma*, followed by a deep

excavation; wing cases raised, flaring at base, compressed in middle, with a prominent point on the margin on dorsal side; on the abdomen three rows of tubercles, those corresponding to the dorsal row of the larva minute, to the first laterals large and conical, the pair on middle of the series particularly prominent; those in the excavation gilded; color variable, in shades of brown from light yellow to dark, often clouded with olivaceous or lilac; sometimes a dark green stripe on the side of abdomen below wing cases. Duration of this stage from 7 to 11 days, according to the weather.

Grapta Interrogationis is found over the entire United States, except on the Pacific slope, flying from Arizona to Montana and through Canada to Nova Scotia. In the northern States, and probably in Canada, it is two-brooded, but in West Virginia there are three broods, and a more or less successful effort for a fourth, depending on the weather late in the fall. In Florida there are at least four broods, and probably five. At Coalburgh, eggs laid by hibernating females give butterflies last of May. This is the first brood of the season. Eggs laid early in June give butterflies early in July—the second brood. Eggs laid last of July give butterflies in September—the third brood. Eggs laid through September give butterflies in October. Individuals of each brood are emerging for some weeks, say for a month, so that the earlier females may be laying eggs while the later members of the same brood are coming from chrysalis. But in case of the fourth brood, it often can be only the earliest hatched larvae which produce butterflies, because by 1st October we are apt to have frost and cold weather, and the food is thereby destroyed. But in some seasons frost holds off till late in the fall, and then the greater part of the larvae might reach chrysalis. As, stated in Can. Ent., x., p. 72, I think it probable that the butterflies of the third brood do not hibernate, but that the continuance of the species depends on the individuals of the fourth brood, usually but few in number. This would account for the species being so rare in this district late in the fall and early in spring as compared with *Comma*, which has no fourth brood. The *Comma* butterflies of the third brood are the hibernators, and are to be seen in multitudes before winter, or in November. Whereas *Interrogationis* then is rarely seen. And yet in midsummer it is as common as is the other species.

Interrogationis is a seasonally dimorphic species, the two forms being also very distinct in both shape and coloration. They are figured in Butterflies of N. A., Vol. 1. The hibernating form is *Fabricii*, but in one

instance, and one only, I have seen an *Umbrosa* early in the year, which must have hibernated. The only hibernating female I have been able to breed from was *Fabricii*, from which I got eggs, 28th April, 1877. The result on and just before 4th June was 21 butterflies, all *Umbrosa*, the first brood of the year. Eggs laid by the females of *Umbrosa* of the first brood have repeatedly produced a mixed brood—the 2nd of the year—but with a majority of individuals *Umbrosa*, as :

11 *Umbrosa* to 6 *Fabricii*

26 " " no "

19 " " no "

1 " " 2 "

14 " " no "

38 " " 16 "

12 " " no "

Total, 121 *Umbrosa*, 24 *Fabricii*.

Eggs laid by the females *Umbrosa* of the 2nd brood have produced a mixed brood, the 3rd of the year, with a larger proportion of *Fabricii*, as :

63 *Umbrosa* to 34 *Fabricii*

2 " " 9 "

1 " " 20 "

1 " " 5 "

46 " " 6 "

21 " " no "

Larvae found—65 " " 4 "

6 " " 16 "

Total, 205 *Umbrosa* to 94 *Fabricii*.

So that while in the 2nd brood *Umbrosa* has had 80 per cent. of the whole product, in the 3rd brood the same form has had but 60 per cent.

Eggs laid by *Umbrosa* of the 3rd brood have produced *Fabricii* only, the 4th brood, as :

No *Umbrosa*, 25 *Fabricii*.

Larvae found—No " 10 "

No " 4 "

No " 2 "

No " 25 "

Also I have recorded in October that no form has been seen by me but *Fabricii*, that many were about, coming to apples in the orchard.

The last brood in Florida, if I may judge by 25 *Fabricii* which emerged from chrysalis, at Coalburgh, in November, 1880, the larvae received from Indian River, as before related, would be all *Fabricii*. It would seem therefore that the species is strictly seasonally dimorphic, the last brood producing *Fabricii*, the hibernating females producing *Umbrosa*, but the intervening broods, like the second brood of *Comma*, producing both forms, but with a majority of individuals *Umbrosa*, or the summer form. This is what might have been expected, when the species became polygoneutic, as the interpolated broods are summer broods. The winter brood holds its own, the summer broods after the first, or original one, are made up of both forms.

In the case of the single *Umbrosa* seen in early spring, of which I have spoken, this may have been an exceptional member of the 4th brood, or a hibernating member of the 3rd.

The larvae, as before described, are very variable. That is, they also are polymorphic, and they may readily be separated into 3 or 4 distinct types, as thus :

1. Body black, finely specked with yellow ; no longitudinal lines on dorsum or upper part of side.
2. Body black, with small spots in place of the specks or dots, the longitudinal lines more or less conspicuous, and either yellow or red, or mixed.
3. Body russet, much covered with yellow spots, giving a pepper and salt appearance, the lines often obsolete.

There are intermediate variations, and there is a great variety in the color of the spines, from deep red and red bases, to yellow, or mixed.

The larvae from Florida were of one of these types only, No. 2, and especially were there none of the russet variety.

The food plants of *Interrogationis* are Hop, Nettle, False Nettle, (*Boehmeria cylindrica*,) Elm, Celtis, and in W. Va. they may be found on all these plants at the same season of the year. But the preference is for Hop and Elm, the first early in the season, the other in August and September. I have near my house many Elm sprouts which are cut down every year, to be replaced in a few weeks by a fresh growth. It is on the tender terminal leaves of these that the female chooses to lay her eggs, either singly or in strings of from 2 to 5 or 6, on the under side of the leaf usually. The egg is not correctly represented in But. N. A., although copied from a drawing made by so good an artist as Mr. Konopicky. It

is too round, and perhaps the example sent for drawing was altered by the alcohol in which it was immersed. The egg really is like that of *Comma* figured on Plate of *Dryas*. The number of ribs varies from 8 to 10. Where a string of eggs is laid, the number of ribs is same in all. It is almost needless to say that the young larvae do not consume their egg shells. A lady correspondent says: "The Graptas scramble through their scuttles in headlong haste, totally regardless as to who may take possession of their late tenements, leaving whole hamlets to prove their presence in the vicinity." The larva attacks the leaf, eating a hole through it, each for itself, and during the first stages feeds about the margin of this hole. During all stages it lives unprotected, except as it lies under the leaf, in contrast with the habit of *Comma*, which after 2nd moult draws the edges of a leaf together at base and finds concealment beneath the awning thus made.

PREPARATORY STAGES OF AGROTIS ANNEXA, Tr.

BY G. H. FRENCH, CARBONDALE, ILL.

Egg.—Diameter .03 inch. Shape globular, the base rather broad, the sides ribbed longitudinally, 12 of these ridges which reach the apex alternating with twice as many more of different lengths. The ridges are connected by slender cross bars, the transverse sides of the included spaces being longer than the longitudinal. The small apical space is punctured. Color white. Duration of this period, 4 days.

Young Larva.—Length .07 of an inch. Color pale grayish-white, a little pinkish on the anterior part. Head and top of joint 1 black. Piliferous spots small, black, the gray hairs arising from each a little longer than the diameter of the body. Legs 16, but the first and second pairs of abdominal, short so that the middle of the body is arched a little in walking. After eating the color of the body is pale grayish green. The piliferous spots, or at least the thoracic, in a single transverse row to each joint. Duration of this period, 8 days.

After 1st Molt.—Length .17 inch. Head brown, the clypeus paler. Color of the body about the same as before, with slight traces of dorsal, sub-dorsal and stigmalal lines, all pale. The piliferous spots regularly arranged, except on the first three joints, where they are in a single transverse row to each joint. Top of joint 1 a little brownish. Legs about as before. Duration of this period, 5 days.

After 2nd Moul. —Length .35 inch. Color pale green with a slight brownish tinge, the dorsal, sub-dorsal and stigmatal lines without this tinge. Piliiferous spots as before in position and color, a black hair from each. There is a dark oblique shade on the dorsum through the piliiferous spots a little above the sub-dorsal line. Head brown, pale above the mouth; joint 1 a little yellowish above with four spots and hairs in front of the regular row. Duration of this period, 3 to 4 days.

After 3rd Moul. —Length .55 inch. Color of the dorsum drab with a narrow dorsal line a little more distinct than the rest, the dorsal space finely mottled with dull green, the dark shade along the piliiferous spots about the same as in the last period. Sides dull green mottled with drab or pale ochre. Sub-dorsal line moderately distinct, the sub-stigmatal line a series of elongate, somewhat lunate spots. The lower half of the sub-dorsal space paler than the upper half. Piliiferous spots as before. Head very pale brownish except the upper half of the cheeks, which are brownish black; jaws and ocelli dark brown. Duration of this period, 3 days.

After 4th Moul. —Length .75 inch. Color of dorsum yellowish drab, a whitish dorsal line bordered each side with a blackish line not very distinct. The oblique blackish shade along the course of the piliiferous spots is prominent, reaching the border to the dorsal line. Sides grayish green the merest trace of a sub-dorsal line on some of the anterior joints. The region of the sub-stigmatal line yellowish green instead of grayish. Stigmata black, the space in the immediate vicinity of each a little yellowish. Venter and sub-stigmatal space green. Piliiferous spots as in the last period. Head of nearly a nankeen color, the front of the cheeks dark brown, the sides mottled. Top of joint 1 brownish. Duration of this period, 5 days.

After 5th Moul. —Length from .90 to 1.00 inch. Color above to near the stigmata greasy blackish gray, with a yellowish drab oblique mark on each joint outside the dorsal piliiferous spots, each mark broadest posteriorly and mottled a little with the ground color. On some there is no trace of dorsal and sub-dorsal lines, except on the cervical shield. Sub-stigmatal line pale gray, faintly yellowish. Venter pale greenish gray. Head pale greenish gray, slightly brownish on some, more or less dark brown on the cheeks, this mottled outside.

Mature Larva. —Length 1.35 inches, width of head .10 inch, of middle of body .20 inch. As the time of pupating approaches the colors are

more blended and of a dark greasy gray, though the general marks are the same as at the first of the period. Duration of this period, 12 days.

Chrysalis.—Length .65 inch, length of wing cases from anterior end .39 inch, of leg and antennae cases .40 inch, the latter reaching a little beyond the hind margin of joint 5 of the abdomen. Depth of thorax .18 inch, of abdominal joint 1, .18 inch, of joint 3, .19 inch, showing the chrysalis to be about cylindrical. Anterior part rounded down to the front of the head. The tip of anal joint ending in two short conical points. General surface smooth and shining, but the anterior edge of the dorsal part of joints 5 to 8 very much roughened. Color rather pale brown, the following parts dark brown: eyes, humeri, stigmata, tip of anal joint and the dorsal anterior part of joints 5 to 8. Duration of this period from 25 to 46 days.

About the first of August, 1882, the moth from which the eggs upon which my observations were taken, was captured, and the eggs were deposited August 3rd. The egg and larval history covered a period of 40 days, and the pupal was from 25 to 46 days more, making in round numbers from 2 to 3 months from the egg to moth. I do not know the number of eggs that were obtained, or larvæ resulting, but 39 completed all their transformations, having pupal periods as follows:

6 a period of 25 days.

10	"	26	"
9	"	27	"
3	"	28	"
2	"	29	"
3	"	30	"
3	"	32	"
2	"	44	"
1	"	46	"

The last were probably prolonged by the days and nights becoming for a time colder. This will give us two broods at least in a season. I am not sure of the way they pass the winter, though from the moths coming out in October, it is probable that they hibernate here as part grown larvæ, though it may be different further north. Their habits are truly "cut-worm," eating almost anything offered them, and hiding in the dirt during the day time. They were fed for the most part on Knot-grass (*Polygonum aviculare*). A few were kept in a glass dish partly filled with

moist dirt, and as they went down in the dirt by the side of the dish to pupate, I could see that the dirt of which the cocoon was made was mixed with web.

NEW TABANIDÆ.

BY JOHN MARTEN, CARBONDALE, ILL.

Sub-genus Therispectes.—"Eyes pubescent; ocelligerous tubercle more or less distinct; eyes (female) with three or four bright green or bluish cross-bands."

T. Californicus, n. sp. Length 17 mm. Eyes pubescent, with thin purplish bands. Front yellowish-gray; callosity nearly square, brownish, shining, prolonged above; ocelligerous tubercles brownish-black on a black spot. Face and cheeks grayish with white hairs. Palpi yellowish-white with small black hairs. Antennæ reddish; annulate portion of third joint black; upper angle prominent. Thorax grayish-brown with the usual gray stripes and golden yellow pubescence; humerus reddish; pleura and pectus grayish with long white hairs. Abdomen brownish-black, sides of first four segments brownish-yellow, which color leaves a row of black irregular spots in the middle, largest on the second segment and smallest on the third; also dark oblique spots on lateral margins. Venter yellowish with yellow pubescence; darker on the last three segments. Femora black, brownish at the tip; front tibiæ dark brown, proximal end lighter; second and third tibiæ darker toward the tip; tarsi dark brown. Wings hyaline; costal cell light brown; faint clouds in cross-veins and bifurcation of third vein.

Described from one female from California.

T. hæmaphorus, n. sp. Length 16 to 18 mm. Front brownish-gray; callosity black, shining, prolonged in a spindle-shaped line above; ocelligerous tubercle black on a brownish-black spot. Face and cheeks yellowish-gray with gray hairs. Palpi yellowish-white with minute black hairs. Antennæ black, faintly reddish on second joint and base of third joint; third joint but little excised. Thorax grayish-black with distinct gray lines and whitish hairs; humerus reddish; pleura and pectus gray with long dirty gray hairs. Abdomen with broad median band and last three segments brownish-black, sides of other segments fulvous with faint black-

ish spots on lateral margins; a row of grayish triangles on the median band, most distinct on the second segment. Venter fulvous with light hairs, darker towards the tip, and first and second segments more or less dark. Femora black, brownish at the tips; anterior pair entirely black. Tibiæ dark brownish, the anterior pair black at the tip. Tarsi blackish-brown, anterior ones black. Wings sub-hyaline; costal vein slightly brownish, faint clouds on cross-veins and bifurcation of third vein.

Described from two females from California.

T. captonis, n. sp. Length 14 mm. Eyes pubescent, with three purplish cross-bands. Front narrowed anteriorly, yellowish-gray, with black hairs; callosity large, chestnut-brown, shining, prolonged above; subcallus denuded, shining; ocelligerous tubercle dark brown, almost black, and surrounded with black. Face and cheeks gray with white hairs. Palpi yellowish with minute black hairs. Antennæ reddish, annulate portion of third joint black, angle not projecting much. Thorax brownish-black with whitish and yellowish pubescence; humerus reddish-brown; pleura and pectus grayish with white hairs. Abdomen yellow on the sides of segments one to four; a dorsal band and last three segments black; hind margins of segments yellow fringed with golden yellow hairs; venter yellowish with middle of segment one and the tips blackish. Femora black, brownish at tip; first pair of tibiæ black with proximate end brownish; middle and posterior tibiæ brownish with black hairs, darker toward tip; tarsi dark brown. Wings hyaline, costal cell yellowish. Female from California.

Concolorous

T. centron, n. sp.—Length 16 mm.

Female. Habitat Colorado.

Eyes pubescent. Front narrow gray; callosity black shining, a detached, spindle-shaped line above; subcallus denuded, shining; ocelligerous tubercle blackish. Antennæ black, slightly red at base of third joint. Face and cheeks gray with gray hairs. Palpi yellowish. Thorax black with dingy black hairs and five gray lines. Pleura and pectus black with gray pollen and hairs. Abdomen brownish-black; a row of equilateral triangles on the middle and oblique triangles on each side of the first four segments; hind margins fringed with whitish hairs. Venter fulvous with black on first segment, lateral margins and last four segments. Wings hyaline; costal cell yellowish-brown, and very faint clouds on cross-veins

Call

shadiness

and bifurcation of third vein. Femurs grayish-black ; tibiae brown, darker on distal ends ; a fringe of black hairs on outer margins of the second and third pairs ; tarsi brownish-black.

NEW SPECIES AND NOTES ON STRUCTURE OF MOTHS AND GENERA.

BY A. R. GROTE, A. M.

The veins of the wings in the moths are usually considered to fall into four main branches. I would, however, consider them to afford only two series ; vein 1 of the German Entomologists belonging to the median series, and vein 12 to the sub-costal series of venules. In describing the neururation of *Euherrichia* (= *Herrichia* Grote non Staudinger) I have accidentally written "sub-median" for "median." Generic characters in the *Noctuidae* are offered by the disposition of veins 6 to 9 on the fore wings and of the median series on the hind wings, from which vein 5 is sometimes (*Spragueia*) absent. In addition there is the presence of an accessory cell to be noted on primaries, which is caused by the peculiar position and course of the subcostal series of venules.

Genus *CONSERVULA* Grote.

It is surely not necessary to go over the entire structure in the diagnoses of related genera ; the record of a single distinguishing structural feature should suffice. I have, however, usually recapitulated the characters ; in the present case the entire primaries and even external or hind margin distinguishing *Conservula* from *Brotolomia* Led. and *Trigonophora* Led., ex. Hubn. In Lederer's monographic work several genera are partially but sufficiently characterized. I have followed so excellent an authority in considering secondary sexual characters (e. g. as in *Thecophora*) of generic value. In *Conservula* the body vestiture is less hairy and shorter than in *Euplexia*, which the species approaches in size. While Walker and Gueneé do not usually give the structure of eyes and feet, Ochsenheimer, whose genera are all accepted, gives, as I have shown, no characters at all. Hubner's phrases are usually unsatisfactory, though his genera are sometimes good and always remarkable considering his times. In a monograph all the characters should be gone over, but in descriptive work the main object is to make the insect recognizable and to spare words. I

am not aware of any test by which it shall be decided that a genus is sufficiently characterized. When the species is already known, less words are, I should think, needed. It is better to supplement missing characters in a diagnosis, than to needlessly criticize its author, especially in the case where a good number of genera have been fully and clearly made out by him and his work is largely of a pioneer kind, and often has to be accomplished with borrowed specimens or single examples. The difficulty of being always right is shown by Mr. Smith in putting *Polenta* among genera with unarmed tibiae, while, *per contra*, I wrongly stated as it appears (though hesitatingly) that *Feralia* had no ocelli. There is room for careful work in the *Noctuidæ*, but the species must be fully examined as I have tried to do in the genera allied to *Erotyla*. A good lens, a good or perfect male specimen and a duplicate for dissection, a quick eye and experience are needed. If, with all these, patience and courtesy are possessed by the author, who must also know the literature well, satisfactory work cannot fail to be accomplished. Even with all these the student will be disappointed if he expects to produce a "Synopsis" that shall be correct and complete, in a short time. We probably shall have to classify nearly 2,000 kinds of *Noctuidæ*; I have examined or described about 1,200.

Genus PLATYSAMIA Grote.

Hubner's genus *Samia*, erected in the Verzeichniss for species incorrectly associated, and with a diagnosis devoid of characters of value, is used by anti-Hubnerists instead of *Platysamia*, a term fully explained and correctly limited by me to the three or four species, *Cecropia*, *Gloveri*, *Columbia* and *Ceanothi*. Upon what ground this is excused does not appear. It is not consistent; and can only be done by those who give to Hubner's genera the same value as those of scientific writers. Even in this case the procedure is doubtfully defensible. In using Hubner's genera I have been often guided by the prior use of the rejected term, *i. e.* in preferring *Lithophane* to *Xylina*, *Eustrotia* for *Erastria*, etc., both *Xylina* and *Erastria* being previously proposed by Hubner for different genera from those to which Treitschke and Ochsenheimer gave the terms. The entire question of Hubner's genera has been treated in a personal way, and every attempt I have made to compromise the matter has been met by unnecessary insistence on unimportant points. As it stands now, and taking the "Brooklyn List" as an example, Hubner seems only to be

used where his names overthrow a genus proposed or adopted by myself. Mis-statements are made to sustain this view, as, for instance, when *Cressonia* is made synonymous with *Polyptichus*, whereas we originally showed that *Juglandis* was cited by Hubner with a number of species not properly associated with it, and no name had yet been used for one species which is unique as to structure and has no congener; Mr. Strecker's *Pallens* being based on the pale female variety, and Mr. Butler's *Robinsonii* being only large specimens of our somewhat variable and most interesting insect, first described by Abbot and Smith.

Genus PSEUDOHASIS G. & R.

Mr. Henry Edwards, who has made many interesting observations of the larvae of Californian moths, informs me that he knows the larvae of both *Eglanderina* and *Hera* (= *Pica*), and that they are unquestionably different. The synonymy adopted in my "New Check List" is taken from an article of mine published some years ago in the CANADIAN ENTOMOLOGIST. Doubleday's specimen, described by Harris, is presumably the same as that deposited by him in the British Museum and made afterwards the type of *Pica*. Audubon's figures have no real bearing on the synonymy of the two forms.

Genus EULEUCOPHAES Pack.

Eyes naked; clypeus moderately broad, with coarse dependant vestiture. Male antennae pectinate to the tips, median vein three branched. Wings entire. Forewings pointed at tips; outer margin even. I cannot separate *Tricolor* generically from *Yavapai* and *Maia*. We may follow Dr. Packard and regard the insect as a faded species, owing its color to its peculiar environment, but it is a faded *Hemileuca*. The type of *Maia* and *Nevadensis* departs too little to consider it different; the head is imperceptibly more sunken, the naked eyes almost lost under the dependant vestiture. The pattern of *Tricolor* essentially agrees with that of *Yavapai*. I should therefore consider *Tricolor*, *Yavapai*, *Juno*, *Diana*, *Grotei*, *Nevadensis* and *Maia* congeneric and refer them all to *Hemileuca*. After carefully examining the satiny white *Leucophaeus Neumoezeni* Hy. Edw., one of our most beautiful Bombyces, I find that the head is freer, more prominent than in *Hemileuca*, the front a little narrower, the vestiture shorter and not so overhanging. The male antennae are provided with shorter pectinations. They are in both sexes testaceous, while in *Tricolor* they are brown-black as in the other *Hemileuca*e. The pattern of ornamentation

is different. We have here a common extra-mesial black line, and the appearance is more Saturnia-like. There are two spots on the cell of forewings, while in *Hemileuca* we have only one. These characters are sufficient for at least a subgeneric division, and I propose to call it ARGYRAUGES, from the sheeny white wings. While in *Hemileuca* the colors are dull, in *Argyrauges* the fore wings especially are glossy and the colors bright. In *Argyrauges* the wings seem a little broader and fuller, but they hardly differ from *Maia* in this respect. The squamation of the wings is of a different character. The neuration, so far as I can observe it without denuding the wings, seems essentially the same in all these forms. There is a tendency in *Maia* and *Nevadensis* to vary in a different direction from the other forms. So far as I recollect, Dr. Hopffer's male and female types from Texas, in the Imperial Museum at Berlin, his *H. Grotei*, is more like *Maia*, though opaque, than the type of *Yavapai*. It was the first of the species, allied to *Maia*, to be described. While *Nevadensis* seems to be hardly more than a variety of *Maia*, I have never seen either *Juno* or *Diana*, but, from information, it seems likely that they are the same. Is *Diana* not the same as *Grotei*?

HYPERCHIRIA ZEPHYRIA Grote.

♀. Fore wings blackish fuscous, very dark, with an even white stripe from apex to middle of inner margin. Hind wings bright yellow in the disk with a large ocellus like *Io*; the yellow field is confined by an outer black line; terminal field pale fuscous shaded. Size of *H. Pamina* or a little larger, allied to it by the pale fawn abdomen shaded broadly above with red. The male differs by the abdomen all red above. The base of secondaries show longer pink red hairs. Beneath discolorous fuscous, with white discal dots surrounded by black on primaries. Thorax fuscous; marked where the wing touches the sides with white. New Mexico. Prof. F. H. Snow.

This is a notable addition to North American Bombyces.

MARMOPTERYX SPONSATA, n. s.

Above very pale ochrey, silky, immaculate except that the white bands of the under surface are reflected; fringes white checkered with brown. Beneath primaries as above; costa and apices yellow, strigate with red; a whitish band interrupted before vein 4 at extremity of all very vaguely indicated. Hind wings yellow strigate with red except for a space on internal margin before the band, where they are blackish. A broad white

band broken superiorly and interrupted at the binding; it appears as a spot again above the white discal spot. Body light ochrey above, white beneath. Expanse 30 mil. New Mexico, Las Vegas. Prof. Snow.

This must be allied to *Formosata* and *Dryadata*; it differs from the latter description in the color not being "russet" and in the interrupted mesial band beneath. Smaller and paler than *Seifferti*. No. 1015.

AGROTIS DOLLII, n. s.

♂ ♀. Male antennæ pectinate, ciliate. Eyes naked, unlashd. Tibiæ all armed. Labial palpi with spreading hairs. Base of legs and thorax beneath pilose. In appearance allied to the *Lagena-Vernilis* group, but not unlikely best placed near *Rileyana*. Gray washed with rusty ochreous. The ♀ shows the pale claviform spot. There are rusty cuneiform marks before the s. t. line; the terminal space is darker; median space grayer than the rest. The rusty ochrey paler tint obtains over subterminal space. Orbicular small, sagittate, pointed outwardly. Reniform small, upright, scroll-shaped, flecked with white on median vein. T. a. line with large teeth; t. p. line denticulate; both lines single, faint dark gray, rather approximate. Thorax rusty gray. Hind wings white in both sexes; veins incompletely marked; fringe white. Arizona. Coll. Mr. B. Neumoegen. I name this fine species for Mr. J. Doll, who collected it in the San Francisco Mountains. Its colors are not distinct, but they are harmoniously blended, the markings easy to recognize the species by, and it is a well-sized and notable addition to our fauna.

AGROTIS NIVEILINEA, n. s.

♂ ♀. More robust than *Ridingsiana*, with white secondaries like *4-dentata*, stouter than this or *Cicatricosa*. A white line crosses the tegulæ, parallel with the white streak on subcostal vein. Thorax fuscous. Color varying to rusty fuscous, the female and most of the males tend to be pale. Median vein narrowly striped with white. A rusty stain on the subequal stigmata. White dentate shades accompany more prominently the black veins 3 and 4, and less so veins 6 and 7. Median lines black, lunate, relieved by rusty shades. Hind wings white with terminal line and white fringes. Expanse 35 mil. Arizona, Mr. Doll. Nearly a dozen examples.

HELIOPHILA RIMOSA, n. s.

♂. Fore wings hoary gray, something like *Ligata* in color; irrorate with dark speckles, and with a faint warm shade reminding one a little of *Unipuncta* in these respects. Allied to *Commoides*; no lines or spots

visible except that there is a continuous series of excessively minute sub-terminal dots, and the median vein is faintly marked with white and edged with black, the white color accentuated at base of 3rd and 4th m. nervules. Hind wings pale gray, whitish; veins soiled. Beneath a blackish shade marks the inception of s. t. line on costa, and the median vein is shaded at base of nervules. Hind wings with costa darker; no lines or spots. Face and pectus a little smoky; fore-tibiæ pale outwardly. Thorax gray; abdomen paler. Eyes hairy. *Expanse* 34 mil. Kittery Point, Mr. Thaxter.

HADENA HAUSTA, n. s.

♂. A small species related to the European *H. Strigilis*, but with the dark shade not extending over the reniform, which with the s. t. space is grayish. Deep brown from base to t. p. line except over reniform, beyond which the geminate t. p. line is exerted roundedly. Terminal space narrow, ferruginous. A costo-apical light-brown spot on s. t. space. Fringes dark, finely cut with pale. A black mark in place of claviform spot, crossing median space. Median lines double, indistinct. Hind wings pale fuscous, with mesial line; beneath with distinct dot and a fine dark line. Anal hairs somewhat yellowish. Head and thorax dusky brownish. Smaller and darker than *H. Modica*. *Expanse* 21 mil. Kittery Point, Me. Mr. Thaxter.

ZOTHECA VIRIDIFERA Grote.

Allied to var. *Viridula* of *Tranquilla* in color and size. The median lines are nearer together on internal margin. An olive-green patch on cell between the concolorous obsolete stigmata; another larger and paler fills the median space below s. m. fold to internal margin. Transverse lines single, olivaceous; t. p. exerted over median veins; s. t. marked only on costa. General color a faded pale olivaceous; hind wings paler with exterior line. Arizona; coll. B. Neumoegen, Esq.

SPRAGUEIA SORDIDA, n. s.

An obscurely colored species, with the fore wings rather narrower than usual. Primaries dark colored, fuscous brown, broken by pale scales, the most prominent mark a pale yellowish costo-apical spot, set in a deep brown pre-apical shade. The base is olive fuscous to a deeper brownish transverse anterior band; the disc is broken with pale scales to costa enclosing a brown mark. The whole very indistinct. Hind wings silky fuscous, deeper shaded terminally. Beneath silky fuscous; costa of pri-

maries narrowly pale yellow and the light yellow costo-apical spot repeated; internal margin pale. Texas. *Expanse* 15 mil. In my collection.

No one who has carefully examined our dozen species of *Spragueia*, and carefully dissected, as I have done, all but two or three, observing the neurulation and the narrow wings, can fail to consider the genus valid and essentially different from *Erotyla sulphuralis* of Europe.

(To be Continued.)

CORRESPONDENCE.

DEAR SIR: The unusually mild and balmy weather that we have been enjoying for the last week has made it an easy task for the Entomologist to neglect his cabinet and correspondence, even now, in the very heart of the exchanging season, and go out into the woods in search of treasures. Thus many a luckless *Vanessa* or *Grapta*, beguiled by the warm, seductive sun from her winter quarters, to have a last aerial promenade before her long cold nap, has found her way into our collections. The morning of Thanksgiving Day here (9th Nov.) seemed to outdo all its fellows in its efforts to charm grumbling mankind, and seemed to insist on every one being thankful and happy. To the lover of flowers the woods provided several autumn blossoms of such flowers as *Viola blanda* and *V. Canadensis*, late blooms of *Solidagos*, *Achillea millefolium*, and stunted Asters whose heads had been broken or eaten off by cattle, but who were yet determined to have their look at the world. Among the damp trees the gauzy-winged male moth of the canker worm could frequently be seen hurriedly flying from tree to tree in search of his wingless wife. On the walls of a house several specimens of the curious little Hammer-headed Fly, *Sphyracephala brevicornis*, were taken. A fine specimen of *Vanessa Milberti*, which came to peer at me by settling within a couple of feet of my head, reminded me of the following, which formerly appeared in the Dublin Penny Journal, and which, as such literature is not at all common, I thought might be entertaining to some of the readers of the ENTOMOLOGIST:

"At the last meeting of the Entomological Society, Feb'y 5, 1844, a beautiful specimen of *Pontia rapæ*, evidently just disclosed from the chrysalis, was exhibited by F. Bond, Esq., which he had captured during the preceding month."

Child of the Summer, what doest thou here,
In the sorrow and gloom of the weeping year?
When the roses have withered that bloomed on thy birth,
And the sunbeam that nurs'd thee has passed from the earth;
The flowers that fed thee are frozen and gone—
Thy kindred are perished, and thou art alone—
No one to welcome—no one to cheer—
Child of the Summer, what dost thou here?
Yet 'tis sweet thy gossamer wing to view,
Revelling wild in the troubled blue—
Heeding nor rain, nor snow, nor storm—
Buffeting all with thy tiny form.
Even thus the hope of our summer days,
In the heart's lone winter gaily plays—
Thou art the type of that hope so dear—
Child of the Summer! thou'rt welcome here!

Welcome 'mid sorrow, and gloom, and showers,
Emblem of gladness that once was ours—
Emblem of gladness that yet will come,
When the sun-bright ether will be thy home;
And myriads of others as bright as thou,
Will revel around us—all absent now:
Emblem of hope to the mourner dear,
Child of Summer! thou'rt welcome here!

Ottawa, Nov. 13th, 1882.

JAMES FLETCHER.

DEAR SIR: On the 16th of August last I captured in our orchard a beautiful female specimen of *Papilio cresphontes* Cram., in perfect condition and evidently not long emerged from chrysalis. Some days later (Aug. 22) a specimen was seen and pursued without success, and on the 29th another very large female was taken. As one of the food plants of the larva, Prickly Ash (*Zanthoxylum americanum* Will.) is abundant here, I think they must have bred in this locality, which is about fifteen miles south of Montreal. I think this is the first record of this butterfly being taken in the Province of Quebec. *Euptoieta claudia* Cram., another butterfly rare in this latitude, was taken by me August 15, 1874, near a hop-field, and is now in the collection of the Montreal Nat. Hist. Society. I mention this as Mr. Edwards gives Canada no credit for this species in his useful Catalogue.

JOHN G. JACK.

Chateauguay Basin, P. Q., Oct. 29, 1882.

BOOK NOTICES.

An illustrated Essay on the Noctuidæ of North America, with "A Colony of Butterflies," by A. R. Grote, A. M. Lge. 8vo., pp. 85. Published by John Van Voorst, Paternoster Row, London, Eng.

This little volume is beautifully got up, printed in bold type on fine paper, and illustrated by four excellent colored plates on which forty-five species of Noctuids are figured. These moths have been previously described in various works, but have not been figured before, and appear to have been selected to adorn this handsome little book on account of their striking beauty; they are the gems of the genera to which they belong and well deserve to be thus made better known. Each specimen is numbered and accompanied by a brief reference or description.

In a preface of 23 pages the author gives a "brief *résumé*" of the sources from whence he has drawn his information; an account is also given here of the life-history of the Cotton Worm from the egg to the perfect insect. It is to be regretted that the author should have marred this section of the work by a personal attack on Prof. Riley, an Entomologist who has done so much good work in Economic Entomology. It seems to us most unfair, whatever the provocation may be, to introduce personal reflections of this sort in a book where the party referred to has no opportunity of defending himself or of an explanation which will reach the same readers. Notwithstanding this defect, the little volume will commend itself for its excellencies otherwise, to all those who are interested in the study of the Noctuidæ, as a valuable and beautiful contribution to this department of Entomology.

Transactions of the Ottawa Field Naturalists' Club. No. 3, 1881-1882; 8vo., pp. 66, with two plates.

We commend this record of the work of the Ottawa Field Naturalists' Club to all those who are interested in Canadian Natural History. In addition to the excellent address of the President, James Fletcher, Esq., it contains reports of the work accomplished by the Geological, Botanical and Entomological branches of the Club; a list of the birds found in the vicinity of Ottawa, and addresses which have been delivered on various natural subjects at the soirees held by the Club.

